

WHAT IS CLAIMED IS:

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- 10005094-120701
1. A ferroelectric liquid crystal display, comprising:
an upper substrate provided with a transparent electrode and an alignment film;
a lower substrate opposed to the upper substrate and provided with a pixel
5 electrode and an alignment film; and
a ferroelectric liquid crystal injected between the upper and lower substrates
and containing a small amount of photo crosslinkable or light-hardening polymer to
form a polymer network.
 - 10 2. The ferroelectric liquid crystal display according to claim 1, wherein a temperature
during injection of the ferroelectric liquid crystal is above a temperature causing a
phase transition from a smectic phase into a nematic phase.
 3. The ferroelectric liquid crystal display according to claim 1, wherein a direct current
voltage is applied to the electrodes of the upper and lower substrates when the
ferroelectric liquid crystal is uniformly aligned.
 - 15 4. The ferroelectric liquid crystal display according to claim 1, wherein a temperature
is varied after injection of the ferroelectric liquid crystal such that the ferroelectric
liquid crystal is changed from a nematic phase into a smectic phase at least once when
the ferroelectric liquid crystal is uniformly aligned.
 - 20 5. The ferroelectric liquid crystal display according to claim 1, wherein the photo
crosslinkable or light-hardening polymer forms a polymer network when exposed to a
light intensity range of an ultraviolet light of about 1 to about 5mW/cm².
 - 25 6. The ferroelectric liquid crystal display according to claim 1, wherein the photo
crosslinkable or light-hardening polymer forms a polymer network when exposed to
ultraviolet light such that a range of total exposure energy of the ultraviolet light
exposed when the polymer is formed is about 240 to about 1200mJ/cm².

7. The ferroelectric liquid crystal display according to claim 5, wherein an ultraviolet lamp for generating the ultraviolet light is selected from any one of a Hg lamp and a Xe lamp.

8. The ferroelectric liquid crystal display according to claim 6, wherein an ultraviolet lamp for generating the ultraviolet light is selected from any one of a Hg lamp and a Xe lamp.

9. The ferroelectric liquid crystal display according to claim 7, wherein a wavelength range of the ultraviolet light is about $365 \pm 100\text{nm}$.

10. The ferroelectric liquid crystal display according to claim 8, wherein a wavelength range of the ultraviolet light is about $365 \pm 100\text{nm}$.

11. A method of fabricating a ferroelectric liquid crystal display, comprising the steps of:

joining an upper substrate provided with a transparent electrode and an alignment film to a lower substrate opposed to the upper substrate and provided with a pixel electrode and an alignment film;

injecting a ferroelectric liquid crystal having a photo crosslinkable or light-hardening polymer between the joined upper and lower substrates;

uniformly aligning the ferroelectric liquid crystal; and

exposing an ultraviolet light to the uniformly aligned ferroelectric liquid crystal.

12. The method according to claim 11, wherein a temperature upon injection of the ferroelectric liquid crystal is above a temperature which causes a phase transition from a smectic phase into a nematic phase.

13. The method according to claim 11, wherein a direct current voltage is applied to the electrodes of the upper and lower substrates when the ferroelectric liquid crystal is uniformly aligned.

14. The method according to claim 11, wherein a temperature is varied such that the ferroelectric liquid crystal is changed from a nematic phase into a smectic phase at least once when the ferroelectric liquid crystal is uniformly aligned.
15. The method according to claim 11, wherein a light intensity range of an ultraviolet light exposed when the polymer network is formed is about 1 to about 5mW/cm².
16. The method according to claim 11, wherein a range of total exposure energy of the ultraviolet light exposed when the polymer is formed is about 240 to about 1200mJ/cm².
17. The method according to claim 11, wherein an ultraviolet lamp for generating the ultraviolet light is selected from any one of a Hg lamp and a Xe lamp.
18. The method according to claim 17, wherein a wavelength range of the ultraviolet light is about 365 ± 100nm.
19. A ferroelectric liquid crystal cell, comprising:
an upper substrate provided with a common electrode and an alignment film;
a lower substrate provided with a TFT array layer and an alignment film; and
a ferroelectric liquid crystal provided in a space between the upper and lower substrates and containing photo crosslinkable or light-hardening polymer.
20. The ferroelectric liquid crystal cell according to claim 19, wherein the ferroelectric liquid crystal has a phase selected from one of an isotropic phase and a nematic phase.
21. The ferroelectric liquid crystal cell according to claim 20, wherein the ferroelectric liquid crystal is phase-changed from a nematic phase into a smectic phase and simultaneously aligned in the direction of one of the two states.
22. The ferroelectric liquid crystal cell according to claim 19, wherein a direct current voltage is applied to the upper and lower substrates while slowly lowering a temperature of the ferroelectric liquid crystal.

23. The ferroelectric liquid crystal cell according to claim 19, wherein an ultraviolet light is exposed to the ferroelectric liquid crystal to make a polymer network.

24. The ferroelectric liquid crystal cell according to claim 23, wherein a light intensity range of the ultraviolet light exposed when the polymer network is formed is about 1 to about 5mW/cm².

25. The ferroelectric liquid crystal cell according to claim 23, wherein a total exposure energy ranged of the ultraviolet light is about 240 to about 1200 mJ/cm².

26. The ferroelectric liquid crystal cell according to claim 23, wherein an ultraviolet lamp for generating the ultraviolet light is selected from any one of a Hg lamp and a Xe lamp.

27. The ferroelectric liquid crystal cell according to claim 23, wherein a wavelength range of the ultraviolet light is about $365 \pm 100\text{nm}$.

28. The ferroelectric liquid crystal cell according to claim 19, wherein when a temperature of the ferroelectric liquid crystal is lowered to a temperature which causes a phase change into a smectic phase, the ferroelectric liquid crystal is uniformly aligned.

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